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| 09/696,432      | 10/25/2000  | Dumitru Mihai Ionescu | NC17502             | 2501             |

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EXAMINER

LIU, SHUWANG

ART UNIT

PAPER NUMBER

2634

DATE MAILED: 02/13/2003

Please find below and/or attached an Office communication concerning this application or proceeding.

**Office Action Summary**

Application No.

09/696,432

Applicant(s)

IONESCU, DUMITRU MIHAI

Examiner

Shuwang Liu

Art Unit

2634

-- The MAILING DATE of this communication appears on the cover sheet with the correspondence address --

**Period for Reply**

A SHORTENED STATUTORY PERIOD FOR REPLY IS SET TO EXPIRE 3 MONTH(S) FROM THE MAILING DATE OF THIS COMMUNICATION.

- Extensions of time may be available under the provisions of 37 CFR 1.136(a). In no event, however, may a reply be timely filed after SIX (6) MONTHS from the mailing date of this communication.
- If the period for reply specified above is less than thirty (30) days, a reply within the statutory minimum of thirty (30) days will be considered timely.
- If NO period for reply is specified above, the maximum statutory period will apply and will expire SIX (6) MONTHS from the mailing date of this communication.
- Failure to reply within the set or extended period for reply will, by statute, cause the application to become ABANDONED (35 U.S.C. § 133).
- Any reply received by the Office later than three months after the mailing date of this communication, even if timely filed, may reduce any earned patent term adjustment. See 37 CFR 1.704(b).

**Status**

- 1) ☒ Responsive to communication(s) filed on 22 October 2000.
- 2a) ☐ This action is **FINAL**.                      2b) ☒ This action is non-final.
- 3) ☐ Since this application is in condition for allowance except for formal matters, prosecution as to the merits is closed in accordance with the practice under *Ex parte Quayle*, 1935 C.D. 11, 453 O.G. 213.

**Disposition of Claims**

- 4) ☒ Claim(s) 1-20 is/are pending in the application.
- 4a) Of the above claim(s) \_\_\_\_\_ is/are withdrawn from consideration.
- 5) ☐ Claim(s) \_\_\_\_\_ is/are allowed.
- 6) ☒ Claim(s) 1-20 is/are rejected.
- 7) ☐ Claim(s) \_\_\_\_\_ is/are objected to.
- 8) ☐ Claim(s) \_\_\_\_\_ are subject to restriction and/or election requirement.

**Application Papers**

- 9) ☒ The specification is objected to by the Examiner.
- 10) ☒ The drawing(s) filed on \_\_\_\_\_ is/are: a) ☐ accepted or b) ☒ objected to by the Examiner.
- Applicant may not request that any objection to the drawing(s) be held in abeyance. See 37 CFR 1.85(a).
- 11) ☐ The proposed drawing correction filed on \_\_\_\_\_ is: a) ☐ approved b) ☐ disapproved by the Examiner.
- If approved, corrected drawings are required in reply to this Office action.
- 12) ☐ The oath or declaration is objected to by the Examiner.

**Priority under 35 U.S.C. §§ 119 and 120**

- 13) ☐ Acknowledgment is made of a claim for foreign priority under 35 U.S.C. § 119(a)-(d) or (f).
- a) ☐ All b) ☐ Some \* c) ☐ None of:
1. ☐ Certified copies of the priority documents have been received.
  2. ☐ Certified copies of the priority documents have been received in Application No. \_\_\_\_\_.
  3. ☐ Copies of the certified copies of the priority documents have been received in this National Stage application from the International Bureau (PCT Rule 17.2(a)).
- \* See the attached detailed Office action for a list of the certified copies not received.
- 14) ☐ Acknowledgment is made of a claim for domestic priority under 35 U.S.C. § 119(e) (to a provisional application).
- a) ☐ The translation of the foreign language provisional application has been received.
- 15) ☐ Acknowledgment is made of a claim for domestic priority under 35 U.S.C. §§ 120 and/or 121.

**Attachment(s)**

- |  |   |
|--|---|
| 1) <input checked="" type="checkbox"/> Notice of References Cited (PTO-892)                                | 4) <input type="checkbox"/> Interview Summary (PTO-413) Paper No(s). _____  |
| 2) <input checked="" type="checkbox"/> Notice of Draftsperson's Patent Drawing Review (PTO-948)            | 5) <input type="checkbox"/> Notice of Informal Patent Application (PTO-152) |
| 3) <input checked="" type="checkbox"/> Information Disclosure Statement(s) (PTO-1449) Paper No(s) <u>6</u> | 6) <input type="checkbox"/> Other: _____                                    |

## **DETAILED ACTION**

### ***Drawings***

1. This application has been filed with informal drawings which are acceptable for examination purposes only. Formal drawings will be required when the application is allowed.

### ***Specification***

2. The disclosure is objected to because of the following informalities:  
What is (THIS SEEMS REVERSED!) in line 16 of page 9 for?  
Appropriate correction is required.

### ***Claim Objections***

3. Claim 5 is objected to because of the following informalities:  
(1) In claim 5, line 2, insert - -transducer- - after "second antenna"; and  
(2) In claim 5, line 6, change "transducer" to - -transducers- -.  
Appropriate correction is required.

### ***Claim Rejections - 35 USC § 112***

4. The following is a quotation of the first paragraph of 35 U.S.C. 112:  
  
The specification shall contain a written description of the invention, and of the manner and process of making and using it, in such full, clear, concise, and exact terms as to enable any person skilled in the art to which it pertains, or with which it is most nearly connected, to make and use the same and shall set forth the best mode contemplated by the inventor of carrying out his invention.

5. Claims 4, 5, 16 and 17 are rejected under 35 U.S.C. 112, first paragraph, as containing subject matter which was not described in the specification in such a way as to enable one skilled in the art to which it pertains, or with which it is most nearly connected, to make and/or use the invention.

As shown in figure 1 and disclosed on pages 10-12 in the application, the modulator (28) comprises a symbol assignor (32) and a mapper/router (34). The specification does not describe "a router coupled between said modulator and the set of antenna transducers." The router is within the modulator instead of coupling the modulator.

***Claim Rejections - 35 USC § 102***

6. The following is a quotation of the appropriate paragraphs of 35 U.S.C. 102 that form the basis for the rejections under this section made in this Office action:

A person shall be entitled to a patent unless –

(b) the invention was patented or described in a printed publication in this or a foreign country or in public use or on sale in this country, more than one year prior to the date of application for patent in the United States.

(a) the invention was known or used by others in this country, or patented or described in a printed publication in this or a foreign country, before the invention thereof by the applicant for a patent.

7. Claims 1-4, 6-8, 10-16, and 18 are rejected under 35 U.S.C. 102(b) as being anticipated by Seshadri (US 5,479,448).

As shown in figures 1-6, Seshadri discloses:

(1) regarding claims 1 and 10:

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a sending station (figure 1) having an antenna transducer set formed of at least one antenna transducer at which the data to be sent is transduced into electromagnetic form, an improvement of apparatus for placing the data in a form to facilitate communication thereof upon the communication channel, said apparatus comprising:

a modulator (108 ...) coupled to receive a group of encoder (106) output symbols, the encoder output symbols encoded representations of the data to be communicated upon the communication channel (column 6, lines 3-42), said modulator for forming a modulated sequence of modulator output symbols, the modulator output symbols of a number corresponding to a number of encoder output symbols of which the group of encoder output symbols are formed together with a number of antenna transducers of which the antenna transducer set is formed (column 3, lines 47-53 and column 9, lines 25-35).

(2) regarding claims 2 and 14:

wherein the number of the modulator output symbols forming the modulated sequence of modulator output symbols corresponds to a product of the number of the encoder output symbols and the number of antenna transducers (column 7, lines 15-25).

(3) regarding claims 3 and 15:

wherein the modulated sequence of the modulator output symbols comprises a serially-generated sequence (111).

(4) regarding claims 4 and 16:

further comprising a router (201 or 111 and 115) coupled between said modulator and the set of antenna transducers, said router selectably operable to route selected ones of the modulator output symbols to the at least one antenna transducer of the set of antenna transducers (column 7, lines 15-25).

(5) regarding claims 6 and 18:

wherein said modulator comprises a space-time modulator which exhibits a unitary rate of modulation such that the modulated sequence formed thereat, when transduced onto the communication channel by the set of antenna transducers, exhibits a bandwidth substantially corresponding to a bandwidth required to communicate the encoded output symbols when transduced by a single antenna transducer (column 2, lines 30-41, column 3, lines 25-57 and column 9, lines 50-59).

(6) regarding claim 7:

wherein the modulated sequence formed by said modulator forms a QPSK (Quadrature Phase Shift Keying) modulated sequence (figure 2).

(7) regarding claim 8:

wherein the encoder output symbols applied to said modulator comprise channel-encoded symbols encoded in a manner by which to create time redundancy into the data of which the encoder output symbols are representative (column 6, line 3-column 8, line 22).

(8) regarding claim 10:

the communication system of claim 1 in which the data transmitted upon the communication channel is transmitted to a receiving station (figures 4-6), a further

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improvement of apparatus for the receiving station, said apparatus comprising: a demodulator (310 and 320) coupled to receive indications of the data once received at the receiving station, said demodulator for demodulating the indications (311) provided thereto.

(9) regarding claim 11:

wherein the indications of the data to which said demodulator is coupled to receive comprise channel-decoded indications (313).

(10) regarding claim 12:

wherein said demodulator performs joint demodulation and decoding operations (310 and 320).

8. Claims 1-20 are rejected under 35 U.S.C. 102(a) as being anticipated by Shammons et al. (WO 0018056 A1, see IDS, paper #6).

As shown in figures 1-6, Shammons et al. discloses:

(1) regarding claims 1 and 10:

a sending station (figure 1) having an antenna transducer set formed of at least one antenna transducer at which the data to be sent is transduced into electromagnetic form, an improvement of apparatus for placing the data in a form to facilitate communication thereof upon the communication channel, said apparatus comprising:  
a modulator (62 ...) coupled to receive a group of encoder (60) output symbols, the encoder output symbols encoded representations of the data to be communicated upon the communication channel (pages 3-4 and pages 10-15), said modulator for

forming a modulated sequence of modulator output symbols, the modulator output symbols of a number corresponding to a number of encoder output symbols of which the group of encoder output symbols are formed together with a number of antenna transducers of which the antenna transducer set is formed (pages 3-4, pages 10-15 and pages 59-63).

(2) regarding claims 2 and 14:

wherein the number of the modulator output symbols forming the modulated sequence of modulator output symbols corresponds to a product of the number of the encoder output symbols and the number of antenna transducers (pages 3-4, pages 10-15 and pages 59-63).

(3) regarding claims 3 and 15:

wherein the modulated sequence of the modulator output symbols comprises a serially-generated sequence (68).

(4) regarding claims 4 and 16:

further comprising a router (62) coupled between said modulator and the set of antenna transducers, said router selectably operable to route selected ones of the modulator output symbols to the at least one antenna transducer of the set of antenna transducers (pages 3-4, pages 10-15 and pages 59-63).

(5) regarding claims 5 and 17:

wherein the set of antenna transducers comprises a first antenna transducer (1) and at least a second antenna transducer (2), wherein said router forms a serial-to-parallel converter (for converting the serially-generated sequence of which the



modulated sequence formed by said modulator is formed into a first and at least second parallel sequence (62) for application to the first and at least second antenna transducer (pages 3-4, pages 10-15 and pages 59-63).

(6) regarding claims 6 and 18:

wherein said modulator comprises a space-time modulator which exhibits a unitary rate of modulation such that the modulated sequence formed thereat, when transduced onto the communication channel by the set of antenna transducers, exhibits a bandwidth substantially corresponding to a bandwidth required to communicate the encoded output symbols when transduced by a single antenna transducer (pages 3-4, pages 10-15 and pages 59-63).

(7) regarding claim 7:

wherein the modulated sequence formed by said modulator forms a QPSK (Quadrature Phase Shift Keying) modulated sequence (abstract).

(8) regarding claim 8:

wherein the encoder output symbols applied to said modulator comprise channel-encoded symbols encoded in a manner by which to create time redundancy into the data of which the encoder output symbols are representative (pages 3-4, pages 10-15 and pages 59-63).

(9) regarding claims 9 and 19:

wherein the modulated sequence of modulator output symbols comprises a plurality of sequence portions, the plurality of sequence portions arranged to form

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columns of a code matrix in which successive rows defined by the code matrix concatenated together define a codeword (pages 3-4).

(10) regarding claim 10:

the communication system of claim 1 in which the data transmitted upon the communication channel is transmitted to a receiving station (figure 2), a further improvement of apparatus for the receiving station, said apparatus comprising: a demodulator (76, 80 and 86) coupled to receive indications of the data once received at the receiving station, said demodulator for demodulating the indications provided thereto (pages 3-4, pages 10-15 and pages 59-63).

(11) regarding claim 11:

wherein the indications of the data to which said demodulator is coupled to receive comprise channel-decoded indications (84).

(12) regarding claim 12:

wherein said demodulator performs joint demodulation and decoding operations (82 and 84).

(13) regarding claim 20:

The method of claim 19 further comprising the additional operations of: transmitting the modulated symbols upon the communication channel to a receiving station (figure 2); and demodulating (76, 80 and 86) the modulated symbols once received at the receiving station.

**Conclusion**

9. Any inquiry concerning this communication or earlier communications from the examiner should be directed to Shuwang Liu whose telephone number is (703) 308-9556.

If attempts to reach the examiner by telephone are unsuccessful, the examiner's supervisor, Stephen Chin, can be reached at (703) 305-4714.

**Any response to this action should be mailed to:**

Commissioner of Patents and Trademarks  
Washington, D.C. 20231

**or faxed to:**

**(703) 872-9314 (for Technology Center 2600 only)**

Hand-delivered responses should be brought to Crystal Park II, 2121 Crystal Drive, Arlington, VA, Sixth Floor (Receptionist).

Any inquiry of a general nature or relating to the status of this application or proceeding should be directed to the Technology Center 2600 Customer Service Office whose telephone number is (703) 306-0377.



Shuwang Liu  
Primary Examiner

February 4, 2003